Asian Journal of Multidimensional Research
ISSN: 2278-4853 Vol. 12, Issue 6, June 2023 SJIF 2022 = 8.179
A peer reviewed journal

CARDIOTOXICITY OF POLYCHEMOTHERAPY IN ACUTE MYELOID LEUKEMIA AND METHODS OF THEIR CORRECTION

Makhmonov Lutfullo Saydullayevich*; Amerova Dilafruz Abdukhalimovna; Temirov Nuriddin Najmitdinovich***; Shomurodov Qodir Ergashevich******

*PhD,
Head of the Department Hematology,
Samarkand State Medical University,
Samarkand, UZBEKISTAN

**Assistant,
Department of Hematology,
Samarkand State Medical University,
Samarkand, UZBEKISTAN

***Assistant,
Department of Hematology,
Samarkand State Medical University,
Samarkand, UZBEKISTAN

****Assistant,
Department of Hematology,
Samarkand State Medical University,
Samarkand, UZBEKISTAN

DOI: 10.5958/2278-4853.2023.00076.9

ABSTRACT

Disease-related factors that influence treatment outcomes should be considered at all stages of treatment. This is due to the fact that leukaemia-associated prognostic factors make it possible to assess the volume of the tumor mass, the sensitivity of blast cells to cytostatic drugs, the rate of elimination of leukemic cells, and the volume of MRD.

KEYWORDS: *Tumor Cells, Anemia, Thrombocytopenia, Granulocytopenia, Diagnosis, Symptom, Chemotherapy, Drugs, Cardiotoxicity.*

INTRODUCTION

Basically, clinical manifestations are associated with the replacement of normal hematopoietic tissue by tumor cells (anemia, thrombocytopenia, granulocytopenia), their infiltration of various organs and the production of various cytokines [2]. The debut of AML can be acute with a significant increase in body temperature, severe weakness, intoxication, bleeding, and severe infections. However, the diagnosis is often made by chance during a routine examination or i

n case of hospitalization for another reason. There may be no symptoms on physical examination. But quite often there is an increase in peripheral lymph nodes, liver, spleen (which is most characteristic of mono- and myelomonoblastic leukemia), gingival hyperplasia (with

myelomono- and monoblast variants), skin infiltration (with myelomono- and monoblast variants), hemorrhagic syndrome of varying degrees severity - from petechial rashes to severe bleeding, bone pain, arthralgia, neurological symptoms (meningeal signs - headache, stiff neck, Kernig's symptom, paresis of the facial, oculomotor and other nerves, paresis of the lower extremities, etc.). In blood tests, there may be nonspecific changes: three-line cytopenia, or anemia, or only leukopenia or leukocytosis, or thrombocytopenia. Blast cells may not be detected in the analysis of peripheral blood and, conversely, makeup 90-95% of all leukocytes. The number of leukocytes also varies from less than 1.0 to 200-300x10 /l. In about 15% of cases, leukocytosis of more than 100x10 /l is determined at the onset of the disease.

The differential diagnosis of AML is simple, since if there is morphological confirmation (blast cells in punctate and/or peripheral blood), the diagnosis is obvious. Difficulties arise at the first stages - in the analysis of peripheral blood smears when there are no blast cells. An increase in the number of leukocytes with a shift of the formula to the left in various infectious processes, as well as thrombocytopenia, anemia and hemorrhagic syndrome in severe infections and sepsis, may cast doubt on the diagnosis of AL, but in such cases, typical blast cells are never detected. Often, differential diagnosis with infectious mononucleosis and some other viral infections is required, especially since clinical symptoms (fever, sore throat, swollen lymph nodes, liver, spleen) may resemble those in AL. Differential diagnosis should be made with the following diseases: other acute leukemias: acute lymphoblastic leukemia, acute biphenotypic leukemia, myelodysplastic syndrome, juvenile myelomonocytic leukemia, leukemia reactions, aplastic anemia; malignant neoplasms of a non-hematological nature (neuroblastoma, rhabdomyosarcoma), especially in the presence of extramedullary lesions, with a blast crisis of chronic myeloid leukemia (the presence of the Philadelphia chromosome does not always help, since this marker can also be detected in newly diagnosed acute leukemia).

It is recommended that all patients with newly diagnosed AML, if possible, participate in clinical trials [5].

At present, there is no single standard for the treatment of AML in children. It is recommended for all patients with newly diagnosed AML who cannot be included in clinical trials, an induction course followed by consolidation and, for high-risk patients, allogeneic hematopoietic stem cell transplantation (alloHSCT) [1, 38-40].

Currently, cardiotoxicity, which develops against the background of antitumor treatment, is given great attention. This is due to the fact that modern oncology uses new, more intensified treatment regimens, which, in turn, increases the risk of side effects, including those from the cardiovascular system [1]. The article describes cardiac complications associated with tumor chemotherapy; radiation damage to the heart is a separate topic.

The use of new chemotherapy regimens leads to an increase in the period of relapse-free survival and an increase in the number of patients cured of oncological diseases. It should be pointed out that among these patients, the majority are able-bodied patients, and the development of cardiac complications during chemotherapy leads to a deterioration in the quality of life and a decrease in its duration in potentially curable patients, especially those who already have cardiovascular diseases [1; 8; 7].

Many chemotherapy drugs have cardiotoxicity but currently described a large number of cases of cardiac complications developing against the background of the administration of anthracycline antibiotics, which is associated with their high antitumor activity, as well as their widespread use in various chemotherapy regimens [1; 8]. Anthracycline antibiotics are mainly used as part of various chemotherapy regimens; therefore, one can speak conditionally about "anthracycline cardiotoxicity" in the event of cardiac complications. In addition to anthracycline, cardiotoxicity of many other chemotherapeutic drugs has also been described; below are the drugs that may cause cardiac complications when administered [1, 12].

Subacute cardiotoxicity is rare, mainly manifesting as toxic pericarditis and/or myocarditis several weeks after the last administration of anthracycline antibiotics [6].

Chronic and late chronic cardiotoxicity is characterized by the development of cardiomyopathy with a clinical picture of CHF within 1 year or decades after the end of antitumor treatment, respectively [4]. According to the literature, cardiomyopathy that develops during treatment with anthracycline antibiotics can be both dilated and restrictive, which is not always determined by the dose of the drug [3, 27]. According to our data, in 27.6% of patients who receive combined treatment, including anthracyclines, in the long-term period after the end of chemotherapy, the so-called unclassified cardiomyopathy may develop, which is manifested by a decrease in LV FI without dilatation of its cavity with a gradual increase in end-systolic volume (KSO) LV. And during chemotherapy treatment, there is a statistically significant decrease in end diastolic volume (EDV) and its indexed value. Later, within 6 months after completion of chemotherapy in patients with CHF that developed after treatment with anthracyclines, LV EDV continues to decrease, and in patients without CHF it returns to the initial level [7].

There are also two types of cardiotoxicities, taking into account the reversibility of myocardial damage.

Type I cardiotoxicity is caused by chemotherapy drugs that cause dose-dependent, irreversible structural damage to myocardiocytes. These drugs primarily include the anthracyclines: doxorubicin, epirubicin, idarubicin, the alkylating agents' cyclophosphamide, and the antimicrotubular drug docetaxel.

Type II cardiotoxicity is associated with the following drugs of different groups: trastuzumab, bevacizumab, lapatinib, sunitinib, imatinib, etc., which can cause dose-independent, reversible myocardial functional disorders. Both types of cardiotoxicities may be present in the same patient.

The first step in establishing an increased risk group for cardiotoxicity is a thorough initial assessment of risk factors.

Risk factors for cardiotoxicity are:

1) Cumulative dose of chemotherapy:

- Doxorubicin more than 500 mg/m2;

- Daunorubicin more than 500 mg/m2;

- Epirubicin more than 900 mg/m2;

2) Concomitant or previous RT involving the region of the heart;

3) Female;

4) Patient's age:

- Over 65 years old;

- Under 18 years old.

Combined XT scheme:

- Alkylating or antimicrotubular agents;

- Immuno- or targeted therapy;

- Renal failure.

Previous states:

- Heart disease with an increase in myocardial stiffness;

- Arterial hypertension (AH);

- Genetic factors;

- Obesity;

- Predisposition to thrombosis.

Screening and diagnostic strategies for cardiotoxicity include cardiac imaging (echocardiography (EchoCG), magnetic resonance imaging (MRI) of the heart, myocardial scintigraphy) and biomarker determination (troponin, high-sensitivity troponin I, natriuretic peptide (BNP), high-sensitivity C-reactive protein (CRP)).

REFERENCES:

1. BovelliD. etal. // Минимальные клинические рекомендации Европейского общества медицинской онкологии. М., 2010. С. 423–433.

2. Kulsoom B. et al. Clinical presentation of acute myeloid leukaemia - A decade-long institutional follow-up. // J. Pak. Med. Assoc. 2017. Vol. 67, № 12. P. 1837–1842.

3. Mott M. // Ann. N.Y. Acad. Sci. 1997. V. 824. P. 221.

4. Watts R. // Am. J. Hematol. 1991. V. 36. P. 217.

5. Winestone L.E. et al. Disparities in pediatric acute myeloid leukemia (AML) clinical trial enrollment // Leuk. Lymphoma. Taylor and Francis Ltd, 2019. Vol. 60, № 9. P. 2190–2198.

6. Wong S. et al. // Circulation. 1998. V. 98. P. 100.

7. Емелина Е.И. Состояние сердечно-сосудистой системы у больных лимфопролиферативными заболеваниями, получавших антрациклиновые антибиотики: Дис. … канд. мед. наук. М., 2007. С. 10–36.

8. Поддубная И.В., Орел Н.Ф. // Руководство по химиотерапии опухолевых заболеваний / Под ред. Н.И. Переводчиковой. М., 2011. С. 435–436.

9. Ruziboeva, O. N., Abdiev, K. M., Madasheva, A. G., & Mamatkulova, F. K. (2021). Modern Methods Of Treatment Of Hemostasis Disorders In Patients With Rheumatoid Arthritis. *Ученый XXI века*, 8.

10. Мадашева, А. Г., & Махмудова, А. Д. (2021). Биохимические показатели у больных гемофилией с мышечными патологиями до и после лечения. *Форум молодых ученых*, (4 (56)), 233-238.

11. Gazkhanovna, M. A., Makhmatovich, A. K., & Utkirovich, D. U. (2022). Clinical efficacy of extracorporeal and intravascular hemocorrection methods in psoriasis. *ACADEMICIA: An International Multidisciplinary Research Journal*, *12*(2), 313-318.

12. Мадашева, А. Г. (2022). Коррекция диффузной алопеции при железодефицитной анемии. *Science and Education*, *3*(12), 231-236.

13. Махмудова, А. Д., Жураева, Н. Т., & Мадашева, А. Г. (2022). НАСЛЕДСТВЕННЫЙ ДЕФИЦИТ ФАКТОРА СВЕРТЫВАНИЯ КРОВИ Х-БОЛЕЗНЬ СТЮАРТА-ПРАУЭРА. *Биология*, (4), 137.

14. Абдиев, К., Махмонов, Л., Мадашева, А., & Маматкулова, Ф. (2021). Business games in teaching hematology. *Общество и инновации*, *2*(6), 208-214.